

CLAIMS

What is claimed is:

1. A drive axle assembly for a vehicle comprising:
an input operably coupled to a power source;
at least one axle shaft driven by said input;
an axle housing substantially enclosing said axle shaft;
at least one wheel end including a gear set driven by said axle shaft wherein said gear set is substantially enclosed within a gear housing; and
a pumping mechanism driven by said axle shaft wherein said pumping mechanism pumps a lubricating fluid from a first predetermined fluid level in said axle housing to a second predetermined fluid level in said gear housing, said second predetermined fluid level being vertically higher than said first predetermined fluid level.
2. The drive axle assembly of claim 1 wherein said pumping mechanism comprises an impeller mounted for rotation with said axle shaft.
3. The drive axle assembly of claim 2 wherein said impeller includes a tube portion and a plate portion attached to said tube portion.
4. The drive axle assembly of claim 3 wherein said plate portion is shaped as an auger.

5. The drive axle assembly of claim 3 wherein said plate portion is welded to an outer circumferential surface of said tube portion.
6. The drive axle assembly of claim 3 wherein said tube portion is press-fit onto said axle shaft.
7. The drive axle assembly of claim 3 wherein said plate portion comprises a circular disc with a center opening for receiving said tube portion, said disc having a first radially extending edge positioned at a first location on said tube portion and a second radially extending edge positioned at a second location on said tube portion laterally spaced from said first location to define a fluid flow path.
8. The drive axle assembly of claim 7 including an impeller housing portion laterally positioned between said axle housing and said gear housing, said impeller housing portion defining a cylindrical cavity that receives said rotating impeller.
9. The drive axle assembly of claim 8 including an end plate laterally positioned between said impeller housing and said gear housing, said end plate including a fluid port in fluid communication with a gear cavity defined within said gear housing.
10. The drive axle assembly of claim 9 wherein said fluid port is generally positioned at said second predetermined oil level.

11. The drive axle assembly of claim 9 wherein said impeller pumps said lubricating from said axle housing through said fluid flow path and into said cylindrical cavity to create a fluid dam.

12. The drive axle assembly of claim 9 wherein said end plate includes an overflow port that is positioned vertically higher on said end plate than said fluid port.

13. A method for maintaining a dual fluid level in a drive axle assembly comprising the steps of:

- (a) driving an axle shaft with a power source;
- (b) substantially enclosing the axle shaft within an axle housing;
- (c) driving a wheel end gear set with the axle shaft;
- (d) substantially enclosing the wheel end gear set within a gear housing; and
- (e) pumping lubricating fluid from a first fluid level in the axle housing to a second fluid level in the gear housing where the second fluid level is different than the first fluid level.

14. The method of claim 13 wherein step (e) further includes mounting an impeller to the axle shaft to pump fluid from the axle housing to the gear housing.

15. The method of claim 14 including the steps of positioning an impeller housing laterally between the axle housing and the gear housing and mounting the impeller for rotation within the impeller housing.

16. The method of claim 15 including the step of varying the fluid flow rate from the axle housing to the gear housing by varying the lateral position of the impeller within the impeller housing.

17. The method of claim 15 including the steps of forming the impeller with an auger shape, pumping fluid from the axle housing through the auger and into the impeller housing, damming fluid within the impeller housing to raise the fluid level up to the second fluid level, and transferring fluid from the impeller housing into the gear housing via a port formed in a wall of the impeller housing when the fluid reaches the second fluid level.

18. The method of claim 13 including the step of positioning the second fluid level vertically higher than the first fluid level.